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CAUSAL FACTS AS LOGICAL ENTAILMENTS OF ACTION STATEMENTS

How much can be learned about particular causal sequences solely on the basis of linguistic ompetence? Very little, I will argue. The proposal I criticize here says that the transitive verb-form appearing in an action sentence entails causal facts about a particular sequence whose occurrence makes that sentence true on a given occasion of its use.

Not everyone believes that actions belong to causal sequences. But among those that do, it is generally acknowledged that standard, truth functional operators fail to simulate the connection between an agent's reason and the action that occurred because he had that reason.[1] And it is generally agreed that a primary or 'real' reason and the action it explains cannot be related without qualification in the same way as an explanans yields its explanandum.[2]

The alternative under scrutiny here is this : Some causal inferences about particular action are induced by regularities in speech behavior which are not captured or surface structure of sentences in everyday conversation. A listener makes appropriate associations to causal facts when confronted with such patterns; this is part of what constitutes linguistic competence. For instance language participants who believe that[3]

(1) Jack moved his arm intentionally, ordinarily are impelled to believe that

(2) Jack's arm moved; and further, that

(3) Jack caused his arm to move.

This reasoning has been generalized into the following formula that holds for a large and controversial class of verbs :[4]

$$_{a}V_{T}b \rightarrow bV_{I}$$

Here the subscripts 'T' and 'I' respectively stand for transitive and intransitive forms of the verb 'V'. The further causal inference has been given a general formulation that is over 300 years old, according to Jennifer Hornsby. Quoting her presentation again :

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....[W]here 'a' designates a continuant (not an event) then it is a necessary condition of the truth of 'aV_T-s b' that a cause b to V_I.[5]

These persistent associations are not syntactic, since the schemata do not hold for all substitutions of 'V'. Nor are they semantic entailments in the sense of strict implication or of biconditionality since e.g. (2) may be true while (1) is false. So the precise nature of the entailment is unclear.[6]

Nonetheless, this approach is meant to suggest that just exactly as one assumes that heat caused the wax to melt if one believes that heat melted the wax, so too one assumes that Jack caused his arm to move if one believes that Jack moved his arm. The advantage here is that singular action sentences can be assimilated into the more general class of singular causal statements describing sequences of all sorts. This is an economizing move. If it works then no appeal to a special sort of agent-causation needs to be made to illustrate how primary reasons can be causes.[7]

So for example the transitive verb form of

(4) Jack opened the car door

implies that

(5) Jack caused the car door to open.

Then, by following Donald Davidson's celebrated suggestion for parsing the logical form of singular causal statements, Hornsby translates this one so that it quantifies over events.[8] The first order symbolism then reads that there exists at least two events in ordered sequence, Jack's (action of) opening the car door and the car door's being opened, and the first event (which occurs inside Jack) caused the second.

This reconstruction of sentence (4) is offered as a 'logical continuation' of Davidson's thesis that particular actions are identical to nonrepeatable sequences of events.[9]

But problems arise with this assimlation, chiefly to do with ignoring how sequences are interpreted as actions done intentionally. The examples that follow show that it is misleading to associate causal assumptions with grammatical form because this obscures the degree to which interpreters normatively assess actions while they hypothesize factually about what is going on case by every case.[10] One's beliefs about the contingent facts peculiar to each case are essential not

only to identify sequences as actions of different types, but also to decide whether an agent's intentions have been carried out successfully, ineffectively, inadvertently, deftly, and so on. By stressing the primacy of grammatical contours of action sentences, one may abviate the ability to make crucial distinctions that language participants recognize routinely.

For example, conditions that make it true to say

6) Jack caused the car door to open,

may differ between the situation where

(7) Jack opened the car door intentionally.

and the situation where

(8) Jack opened the car door inadvertently.

Suppose it is correct that sentence (6) containing the word 'cause' follows as a matter of grammatical form both from sentence (7) and from sentence (8). Suppose further that for anyone who is language competent, this transitive verb structure rules that his believing the causal statement expressed by sentence (6) follows from his believing the action statement (7) or (8). But then the causal statement (6) cannot indicate anything in particular about the sequence that did in fact occur, for *that* particular type of sequence counts among the truth conditions for statement (7) or for (8) but certainly not for both.

One might object that the problem here lies not with the causative verb principle under discussion but with this example. Some causalist theorists would insist that the car door's opening is a consequence of John's action and no part of his action. Therefore it is uninteresting to them in a test of any thesis about John's action, done intentionally or not. So I shift back to the example of arm raising, which for some theorists counts as crucial because they view it as a 'basic' type of action.

Attention to language participation reveals that much is assumed tacitly by participants who believe that

(9) Jack raised his arm intentionally at noon.

which is not assumed tacitly if they believe only that

(10) Jack's arm rose at noon.

Suppose Jack is driving towards an intersection and a

language participant observes that Jack's arm rose. Then if he also believes Jack was raising his arm intentionally, it is likely that the observer further believes that

(11) Jack is an agent;

(12) Jack ordinarily regards himself as able to raise his arm;

(13) Jack is aware of what he is doing with his arm while driving;

(14) Jack wanted to make a legal left turn at the intersection;

(15) Jack was making a legal left turn at the intersection at noon.

All these auxiliary beliefs may be crucial to assessing the arm rising as a certain type of act done intentionally. The last is a likely belief to adopt if one believes (9-14). For the statements (9-14) may be true while (15) is false. Neither does (15) follow from the surface structure of any sentence in the set (9-14).

Conversely : the truth of (15) does not entail any details of the observable arm movement in virtue of which statements (9) and (10) hold true. Neither does the grammar of (15) indicate precisely what types of sequence might constitute the truth conditions of the action sentence (15) on any other occasion of its use. Knowing that Jack is making a legal turn does not entail knowing that his arm rose 90^0 from his trunk rather than 105^0 or 45^0. Further, Jack could have been raising his arm incidentally at noon while he announced his left turn with a shout or by switching on a blinker with his foot on the floor pedal. Many different types of causal sequence can constitute the action of making a legal left turn. And yet only one of these types constituted the fixed bodily movements that did in fact occur at noon when the action statement (15) was true.

The problem here is one of overlooking the empirical nature of the beliefs about 'what happened at noon with Jack's arm when he moved it intentionally. This is not a problem peculiar to beliefs about actions. Consider the conditions that make an observer believe

(16) The Morning Star is green.

Suppose he also believes that

(17) 'The Morning Star' names the same planet as 'The Evening Star'.

It does not follow logically from (16) and (17) that (18) The Evening Star is green.

Sybil Wolfram argues that although sentences (16) and (18) express distinct propositions they make the very same statement since they say the same thing about the same object.[11] Still it doesn't follow logically from (16) and (18) that (17) must be true. If one is warranted to infer any one of these propositions because one believes the other two, then this warranty reflects one's knowledge of astronomy, not one's linguistic competence or skill in logical deduction.

Another problem for the causative verb thesis is that linguists themselves dispute about the significance and the source of a persistent ambiguity between 'direct' and 'indirect' causation implied by the transitive verb from.[12]

Suppose it is true that

(19) Jack moved the piano,

entails

(20) Jack caused the piano to move.

Suppose the piano being moved was something Jack brought about intentionally. If one wants to know further causal facts about how Jack's reasoning led to his getting the piano into a new location then it may or may not be trivial whether his getting the job done involved a lot of Jack's muscle rather than a lot of Jack's money.[13] But consider the statement :

(21) Jack ridiculed Jane.

To be true, this statement requires that Jack acted intentionally. So its implications may run contrary to those of its purported causal entailment. For it could be true that:

(22) Jack caused Jane to be ridiculed — inadvertently, by his thoughtlessly flagrant infidelity across town

If on a given occasion of their use action sentences are true in virtue of a fixed type of causal sequence, then details identifying which type of sequence this is in a particular case cannot be specified without knowing further facts about the very episode so described. Grammatical facts about the action sentence by themselves cannot provide such details.

In defending the transitive verb formula for inferring causal facts, Hornsby concedes to its lack of generality. The objection, attributed to Chomsky, is 'that there are constraints on what sort of word

may suitably be attached to these transitive verbs to verify the formula.'[14] But on reading Chomsky's paper (1967) cited by Hornsby, one finds this is not his objection. Chomsky's concern there and elsehere is methodological. He stresses that before endorsing any theoretical principle of grammar one must test it case by case with appropriately selected items in the lexicon. Testing hypotheses about deep structure requires appealing to the reactions of competent speakers, whose judgments in turn are subject to attrition.

According to Chomsky there can be no a *priori* guide for formulating principles of deep structure underlying surface structure, nor for setting limits in advance on the extent of a transformation rule's application. 'This is entirely an empirical issue.'[15]

Chomsky's emphasis on empirical method for correctly analyzing the data of verb cognates is a useful model for analyzing the data of nonverbal behavior called actions in this respect. The latter data classify into distinct types of action case by case. And types of action cross-classify further as successful or as failed, inadvertently, intentionally, irrationally, deftly, prematurely, and so on, case by case.

Whatever linguistic competence is required to recognize sequences as distinct types of action is also required to recognize success and failure case by case. Epistemically, it is unwarranted to prioritize action types over other evaluative attributes applied to sequences of events seen as intentional behavior. Consider the gyrations of agents moving up and down a snowy slope; in order to recognize what they are doing as skiing, one has to know what to count as success, what to count as a mishap, and which sequences to count as incidental to the proceeding. Likewise, whether to count Jack's pressing on the car door handle as part of a terrorist's plot, or an unwitting tragedy, or a foiled attempt to escape, one must know facts about the episode, not facts about the sentences used to describe the episode.

Certainly the linguistic data indicate that thoughts causing an agent's action can be surmised from the way he describes what he was doing. Asking Jack what he thought he was up to by opening the car door suppose he replies, 'I was sabotaging the enemy.' This statement gives evidence of the thoughts that caused his activating the car bomb at noon.

Suppose that subsequenntly it becomes apparent that the bomb was rewired, for by 12:02 Jack's activating the bomb inadvertently caused an explosion at his own headquarters. Thus his action failed. In

order to specify exactly what type of action it was that failed, one must describe the sabotage that Jack was engaged in at noon, as he was pressing the door handle.

The point here is that unless the transitive verb form sometimes does fail to yield causal facts about a sequence described as an action, there can be no way to report that a certain type of intended action never came off properly, or that it succeeded in some way other than the agent thought would happen. From statements an agent might assert about his action one can learn causal facts about the beliefs and attitudes that led him to act. But the fact that a belief is causal does not entail that the content of that belief must be factual. So, having determined the type of action intended, one then requires a certain familiarity with particular facts about the episode thus described, in order to further tell whether the agent succeeded or failed at what he intended. Clearly these facts about the sequence that occurred cannot be gleaned solely from the content or the form of a statement expressing what the agent believes and/or wanted to have happened. For the agent's beliefs may be false and from a falsehood anything follows.

Thus, causal assumptions that follow solely from sentences describing what has been done intentionally cannot be guaranteed to describe elements in the fixed particular sequence constituting what in fact occurred. Even when the agent knows what he is doing and precisely how he has succeeded in doing it, rarely do the agent's thoughts focus on the particular nonrepeatable sequence that constitutes what he has doone. For instance, as I speak I am unaware of the movements in my larynx. [16]

But suppose an agent's thoughts are focussed precisely on the very thing he is doing 'directlly' ; facts about that sequence cannot follow solely from sentences expressing his knowledge. To show why, consider a controlled laboratory experiment, where the agent is a leading neurophysiologist who does know just what he is doing intentionally with his healthy, normal arm. Here the purported entailment may be expected to obtain between what the agent believes he is doing and what he is doing in fact. Still, one cannot be deducing the causal facts exclusively from the content or the structure of the agent's true propositional beliefs or assertions about his action. Otherwise there could be no ground for suspecting him of being mistaken about what he is doing on any other occasion.

It is distracting to separate off from each other the variety of grounds that warrant our causal assumptions about what is going on. Notoriously, there is no unniform way to formulate the recognized distinction between beliefs based on'direct' experience vs. beliefs based solely upon 'semantic' features of other statements one holds true.

Consider a situation where the following statements are all true.

(23) I saw a flash at midnight;

(24) There occurred a flash at midnight;

(25) Lightning struck at midnight;

(26) There was a discharge of electrons from a cloud at midnight.

A blind physicist would be warranted in asserting (24-26) if he heard thunder a moment after midnight, but he would not be warranted in asserting (23) presuming he is totally without retinal stimulation. A nonscinentific layman who can see might be warranted in asserting (23-26). He cannot warrantably infer that lightning struck from (23) alone, although he might be warranted to infer (24) from (23). In any case, what should be said about the grounds for a sighted physicist's asserting (24)? Does he draw this belief from his direct observation of the flash at midnight or from his knowledge of photon emission and electromagnetism?

Apparently the warranty for believing a given statement sometimes depends upon facts about the individual believer. The imoportant point to note here is that there is no uniform way to determine which statements these will be.

Overall, then, it may seem misguided to isolate the way transitive verbs operate as a distinct class to elicit causal beliefs. To polarize sources of inference as logical vs. empirical has been found, on balance, to be unilluminating; to point this out with respect to inferences about events is itself a platitude. By sorting inferences now into a threefold partition of logical form vs. surface structure vs. direct observation, it is hardly evident that we can be doing any better.

Perhaps the more generic concern has to be with gaining clarity about how different sources of inference together warrant causal inferences about actions. Yet suppose we did discover what there is about language participation that allows for the frequency and the case with which we assess and explain actions in everyday

conversation. Nothing so far indicates that we would thereby have hit upon something special about actions that distinguishes them from every other kind of occurrence.*

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NOTES

1. Donald Davidson, 'Causal Relations,' in *Actions and Events (A&E)* (1980) esp. pp. 152-153; 158.

2. Carl G. Hemple, *Aspects of Scientific Explanation* (1965) New York, pp. 466-489.

   Also Davidson, 'Hempel on Explaining Action,' *A&E*, pp. 261-275.

3. H.P. Grice coined the influential phrase 'conversational implicature;' 'Logic and Conversation,' *Speech Acts : Syntax and Semantics* series no.3 ed. P.Cole and J. Morgan (1975) New York. pp. 41-58.

4 Jennifer Hornsby, *Actions* (1980) London, pp. 2, 124. The thesis discussed here is found in her capters one, seven and Appendix A. Recently the inferential power accorded causative verbs was endorsed by James Higginbotham (MIT) in discussion of his paper 'Knowledge of Reference,' delivered 31 May 1988 to Wolfram Society, Oxford. Early reference to verbs that 'signify causation' is in C.J. Ducasse, *Nature, Mind and Death* (1951) Illinois, pp. 103-104. For a different construal of 'causal commitments' I have relied elsewhere on Wilfrid Sellars, 'Actions and Events,' NOUS (1973) pp. 179.202, esp. p. 189.

5. Hornsby, *op. cit.*, p.13.

6. Formal systems have been proposed: H. Reichenbach, *Elements of Logic* (1947) New York. Also in *Causation and Conditionals* ed. E. Sosa (1975) Oxford, see D. Lewis, N. Rescher, R.Stalnaker. p. 132.

7. Davidson, 'Causal Relations,' *A&E* p. 154: Hornsby, *Actions*, p. 132.

8. Hornsby . *op. cit.*, pp. 20. 126.

9. Davidson, it should be noted, explicitly rejects the meanings of verbs and the surface forms of sentences as indicators of logical form: 'Agency' (1971) and in discussion of 'The Logical Form of Action Sentences' *A&E*, pp. 44, 142.

10. Hempel, *Aspects of Scientific Explanation* p. 463.

11. Sybil Wolfram. *Philosophical Logic* (1989) London. p. 69 et pasim.

12. Noam Chomsky. 'Remarks on Nominalization—*Reading in English Transformational Grammer* eds. R. Jacobs & P. Rosenbaum (1970) London. pp. 184-221. p. 218n.16. See also his *Aspects of the Theory of Syntax* (1965) MIT. PP. 189-190. 214n.15.

13. Hornsby sees the concern over this ambiguity as clearly trivial where 'basic' actions are addressed. e.g. Jack's moving his arm: *Action,* pp. 14-15.

14. Hornsby. *op. cit.*, p. 126 n.l.

15. Chomsky, 'Remarks on Nominalization,' *op. cit.*, pp. 185. 186. 188. 193.

16. I owe this point to David M. Rosenthal, 'Propositional Attitudes' seminar at the City University of New York. Graduate Center. 1983.

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